

MEMOIRS FOR THE INGENIOUS.

CONTAINING
Several Curious Observations in *Philosophy,*
Mathematicks, Physick, History, Philology, and
other Arts and Sciences.

IN
Miscellaneous Letters.

By J. DE LA CROSE, Eccl. Angl. Presb.

JULY, 1693.

To be continued Monthly.

VOL. I.

*Sed nihil dulcius est bene quam munita tenere
Edita doctrinâ sapientum templa serena :
Despicere undè queas alios, passimq; videre
Errare atque viam palantes quærere vite,
Certare ingenio.*

Lucret. l. 2.

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Where are to be had the Memoirs for *January, February, March,*
April, May and June.

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Memoirs for the Ingenious.

JULY, 1693.

LETTER XXV.

To the Right Reverend Father in God
GILBERT Lord Bishop of Sarum.

ARGUMENT.

Occasion of this Letter. The least Punishment that can be inflicted on the Corrupters of Religion and Morality, is to shut them up. Boldness of the Publishers of a late Atheistical Book, intituled the Oracles of Reason An Answer to that Part that concerns Deism. The Truth of the Holy Writ justified; some Objections answered. What the Deists ought to prove, to talk rationally. Their Faith: It cannot be demonstrated by the Light of Reason. Comparison between the Deists and Aristotle. The Necessity of the Revelation. The Truth and Certainty of it demonstrated. A new Reason for the Long Lives of the first Patriarchs. The Origin, first Author and Progress of Idolatry. The design of the Founders of Babel. How Religion came to be corrupted, and how long it remained untainted.

My Lord,

THO the Quality of Author, which the hard condition of an Exile has impos'd upon me, almost from my tender years, hath

hath made me known to your Lordship even before this happy Revolution: Yet, I thought not fit to address myself to your Lordship in such a public way as this, nor to be importunate with you for the performance of those kind promises, which you were pleased to make me in *Holland*, and again to repeat since my coming hither. I am now pretty much us'd to hardships, and so far content with my present condition, that I am not ambitious of much more: So that were it only for my own sake, I might have longer superseded directing a Letter to your Lordship in these *Memoirs*. But when I see Religion itself concerned, lewd and prophane Men attempting to shake its very foundation, not only by private Underminings, but even in so public and heinous a manner, as that they make bold to print their impious Collections, and prefix their Names to them: On such an occasion, My Lord, I cannot forbear to awaken that Zeal, which you did not many years ago so successfully employ, in stopping the progress of Superstition and Idolatry, to the great Happiness of this Church and Kingdom. It were to be wish'd that your Lordship, and those other great men, who have obtained so many and so glorious Victories against Popery, should vouchsafe to stop the mouth of our clamorous *Socinians* and *Deists*; tho I confess they are not so terrible as to deserve such worthy Adversaries; and a mean Writer as I am may be pretty even with them, their greatest strength consisting in an inexhaustible stock of confidence. But, my Lord, if you think us sufficient to act the part of Physicians in this occasion, and to hinder the Venom of Irreligion from spreading farther, your Lordships ought, methinks, to use their credit, that spiritual Chirurgions may not be wanting.

——— *Immedicabile vulnus*

Ense recidendum est, ne pars sincera trahatur.

I never was for hanging or burning Heretics, no not *Socinians* and *Deists* themselves, because I am perswaded there is for the most part more prejudice, folly and obstinacy, than malice in their case. But if it be the right of every Society to rid itself from troublesome Members; if it be lawful and even commendable to shut up Fools and Lunaticks in proper houses, lest they should affront or mishandle men of sense in the streets, or in the high way; I do not see why such as go bare-fac'd about to destroy our spiritual life, should not be confin'd as well as those who endanger our corporeal security. In vain they answer 'tis an error of their understanding, which they cannot help; for the Advocates of Mad-men may make the same plea,

plea, and nevertheless not be heard. If all men were of a strong constitution, the danger of letting Lunaticks loose would not be very great, because of their fewness in number; but there are old and weak persons, women and children, that should then lye exposed to the injuries of that furious people. Thus if all the Christians were learned, pious and good Philosophers, *Socinianism* and *Deism* would be only the matter of their scorn or pity. But there are many Children amongst us, who have only as a beginning of spiritual life, who have indeed a good and honest heart, but not an understanding so piercing, nor a Judgment so sound and rightly inform'd, as to become easily Masters of all the objections, which the impious can make against Religion, or any of its Mysteries.

The *Hebrews* use to express *Religion* in general by *the Fear of the Lord*, which is one of its fundamental Articles; and your Lordship knows what commendations the wisest of Kings bestows upon it: *It is the beginning of knowledge, the instruction of wisdom, a strong confidence, a fountain of life: one may get by it riches, honour and life.* But if we ask *Solomon* what is the chief duty of Religion, or *the fear of the Lord*, he will tell us that it is *to hate evil, to depart from evil, to depart from the snares of death; for then a mans ways please the Lord, and he makes even his enemies to be at peace with him.* Prov. xiv. 27. xvi. 6, 7.

This and less would suffice, did I write only for your Lordship, but since this Letter is design'd for the publick, I shall add a weighty consideration, which I have first learned from your self. It has been the policy of the enemies of our Religion, and of the unhappy constitution of this Realm, to sow dissention amongst us; in order to which they have transformed themselves into all sorts of people, Commonwealth-men, Dissenters, Levellers, Quakers, Non-Jurors, Socinians, Deists, Atheists; 'tis all one to them if they can do us mischief. However 'tis strange that this cheat having been so often discover'd and exploded by many grave Divines, and amongst others by your Lordship, they should bring it again upon the Stage; but they cannot leave it off, it has succeeded with them so well, it has embroyl'd us in a Civil War, and so they hope it will do once more. And therefore one may observe them endeavouring to undermine the reputation of the greatest men of our Church, whose zeal and writings have been the greatest obstacle to Popery; as of his Grace my Lord Arch-bishop of *Canterbury*, of my Lord Bishop of *Litchfield* and *Coventry*, of your Lordship, of Dr. *Sherlock*, &c.

Whosoever shall consider this attentively, will not be mov'd by the faint plea for Liberty, which he may read in the Preface to the pretended *Oracles of Reason*, an impious Collection of Sceptical and Atheistical pieces to ridicule the Holy Scripture, the Mysteries and Fundamental Articles of the Christian Religion, printed by way of Letters with the names of the Authors, two Gentlemen very well known in this City. Certainly if the Publishers are not paid for disturbing the peace of the Church and Government, they rather deserve to wear a Fool's Cap than to manage the Pen of an Author: For can they be called wise, who expose themselves to an infamous death, or at least to the hatred of mankind, for such an inconsiderable reward as Booksellers can afford them? Conscience they cannot pretend, for it does not appear through the reading of their Book that they have any Religion at all. They have inserted in it two Papers for *Deism*, only as I take it, to deride reveal'd Religion the more *sarcastically*; for they mock even at *Deism* itself, so that they must needs be either Fools, Atheists or Traitors.

Those that have not read this piece of news (for so I may well call it in reference to the boldness of the attempt) will undoubtedly say that I deal disingenuously with those Gentlemen: But I sincerely protest that I have not, for ought I know, any reason of my own to complain of them; neither would I do them any hurt if it lay in my power, unless they should give that name to my taking security of their behaviour for the future. On the other side the Publishers are not men of that consideration in the world that it may be imagin'd I design to raise my self upon their ruin. So that my only aim in this is to awaken the high powers, for the suppressing of this mischievous Book, which I fear is already too much spread abroad, or at least to prevent the coming out of others of the like nature.

Perhaps some will say that this is not fair dealing, and that I have recourse to the Magistrate for want of Arguments. I am content your Lordship and every impartial Reader should judge of it by some few touches I shall have on that part of this Book which concerns *Deism*, and which is, in my judgment, the best written, as likewise the most dangerous.

Page. 196. The first and only argument of the Author runs thus: *That rule, which is necessary to our future happiness, ought to be generally made known to all men. But no Rule of Reveal'd Religion was, or ever could be made known to all men. And therefore no Reveal'd Religion is necessary to our future happiness.* The Major he proves thus. *Our future happiness depends upon our obeying, or endeavouring to fulfill the known will of God. But that Rule which is not generally known cannot be generally obey'd, and therefore*

fore that Rule which is not generally known, cannot be the Rule of our future happiness.

In answer to this, I deny the Minor of the first Syllogism, which is so far from being *matter of fact and uncontrovertible*, as the Author pretends, that it is a plain falshood; at least if we believe the most ancient History extant in the world, the first Book of *Moses*. For by that it appears, that as soon as God had created man, he reveal'd himself to him either immediately, or by the ministry of Angels, that he continu'd so to do to the Antediluvian Fathers, then to *Noah* and the following Patriarchs after the flood.

If it be objected that the Deists deny the authority of the Holy Writ; I shall ask upon what ground they do it, since a bare denial will not suffice. A Chapter, say they, has been added to the *Pentateuch*, containing an account of *Moses's* death and burying; as tho there was any thing more common than to add an Author's life or death at the end of his works. Some few proper names have been changed, the new ones being substituted to the old, as *Dan* for *Laish*, *Gen. xiv. 14.* compared with *Judges xviii. 29.* or a particle inserted here and there, as when 'tis said that the *Canaanite* was then in the Land. *Gen. xii. 6.* As to this last phrase, its genuine and proper sense is, that the posterity of *Canaan* was already settled in the Country, when *Abram* went out of *Ur* in *Caldee*. And as to the change of proper names, were they all new, or invented after *Moses's* Death, it would be, I confess, a strong presumption that this History, in the state we have it now, has not been compil'd by that holy Legislator: but there are so many old appellations which fell into disuse some ages after, (as will appear to those who shall compare *Joh. xv.* with *Nehem. xi. 25-36.*) that this variation has most probably other causes. For instance, it may be ascribed to the foresight of *Moses*, who, having drawn a scheme of the division of the Holy Land, called the several places of it by the new names he had ordered the *Israelites* to impose upon them, after the Conquest. And tho it were imputed to the Transcribers, who, finding another name written in the Margin, took it for a various reading, and prefer'd a word known to them to one they could not understand: tho it were so, I say, it would signify no more, but that the sacred Writings have undergone some small alterations, the common and unavoidable fate of old Books. And can this amount to the constant tradition and testimony of the whole *Jewish Nation*, in all ages, and the confession of their own Enemies, into whose brains it never came to deny that *Moses* is the Author of the Books that bear his name, till after our Saviour's birth?

Certainly,

Certainly, an impartial and sensible Man cannot be guilty of such ridiculous thoughts, and should the Deists themselves judg so amiss in the ordinary occasions of Life, they would quickly appear in their true and proper colours. So that upon the whole, their Cavils are but a sign of their uneasiness, and of their eagerness to find fault with the Holy Writ, as with a Book that confines their passions to too narrow limits. They will suffer no other rule but their own reason, which self-love can easier manage and seduce, than their superficial Learning wrest the Scripture. However did they make any use of that right reason which they cry up so much, they would soon perceive that since they can produce no ancient History of the Creation of the World, and yet are forced to grant it; that they may depress the credit of the Holy Writ, they must needs have recourse to metaphysical Arguments, and prove either that God cannot, or that he will not reveal himself, or at least that he never did: As to us we proffer to demonstrate the affirmative with all the plainness that metaphysical Notions, and historical matters can admit: Let 'em do as much for the negative, and then it will not be very difficult to weigh the reasons of both parties.

But the mischief is that our Deist, tho one of the greatest pretenders of the Club, has not presum'd to attempt it. Perhaps he foresaw that did he go about to prove that God cannot, nor ever did reveal himself, he would contend for Atheism and not for Deism. My Lord, this is matter of fact that the chief position of the Deists that *no revealed Religion is true*, or that God never reveal'd himself, overthrows six Articles of their Belief. And to convince the Reader of it, I beg your leave to insert here the seven Articles of the (b) p.195. Deist's Faith, in the own words of my Author. (b)

1. *That there is one infinite eternal God, Creator of all things.*
2. *That he Governs the World by Providence.*
3. *That 'tis our duty to worship and obey him as our Creator and Governor.*
4. *That our Worship consists in Prayer to him and praise of him.*
5. *That our Obedience consists in the Rules of right Reason, the practice whereof is moral virtue.*
6. *That we are to expect rewards and punishments hereafter, according to our actions in this Life, which includes the Soul's immortality, and is prov'd by our admitting Providence.*
7. *That when we err from the Rules of our Duty we ought to repent and trust in Gods mercy for pardon.*

Now I aver that without the light of the Revelation the six last Articles

Articles are altogether uncertain, and the latter part of the first equivocal, that is, they can never prove them by natural reason so, as to convince a Philosophical mind. 1. It's indeed incontestable that there is one eternal infinite God, and that he is the Creator of all things as to their Beings or Substances, but how will they prove that he is their Creator also, as to their form or manner of Being? How would they answer an *Indian*, or a *Manichee* that should say 'tis some Angel or finite Spirit, to whom God Almighty gave leave to dispose this world into its present form? and a very bad one too, one of those Apostatick Angels, who seduc'd and enslav'd inferior Spirits, and still keeps 'em Prisoner in several Bodies. 2. If so it be, will continue the *Bramine*, the world is not governed by an infinite wisdom, but by the arbitrary power and malicious fancy of that evil Spirit. 3. and 4. And therefore what worship and obedience ought we to pay to a Jaylor and a Tyrant? 5. As to right reason, may surmize a Sceptick, there is no certainty of any such thing, for perhaps that evil Spirit takes his diversion in cheating us, in deluding our Imagination and offering Phantasms to our Senses; so that the conclusions we draw from these false appearances cannot be true. 6. The future rewards and punishments are no less uncertain in the Hypothesis of Deism, tho one should grant the immortality of the Soul, as do the Philosophers of the East-Indies and the *Spinozists* here. For they assert that our Soul is a particle or a modification of the Divine Infinite Substance, included in the body as water in a bottle swimming in the vast Ocean: and that as when the bottle comes to break, its water mixes with the Sea, and is no longer distinguishable from it; so after death our soul is confounded with the universal Spirit of the world, and has neither sense nor remembrance of any thing she has done or suffer'd in the body. Moreover, what would our Deist reply to a foolish *Pythagorean*, who tho he should grant that the Soul is immortal, and remains a separate substance after death, yet should affirm that the finite Spirit who governs this world, is so far from loving Virtue, that he takes pleasure in vexing just men, as a Tyrant does in persecuting honest people, who stick at committing Villanies, to satisfy his Passion.

And thus, my Lord, you see into what abyss of absurdities, these Pretenders to wit would lead us, should we follow the dark light of their wavering reason, instead of the glorious rays of the divine Revelation. What shame is it for mankind, that there be found *Individuum's* amongst 'em, who endeavour to deprive others of the only comfort left 'em against the miseries of this life, viz. the certain

certain hopes of a better State? I own the Deist's Scheme of Religion is more reasonable, than any of the Heathen's; but for this they are owing to our inspir'd Writers. Your Lordship remembers what has been said of *Aristotle*, that he plunder'd the Philosophers who had preceeded him, and by the interest of his Pupil *Alexander the Great*, having gotten almost all the Copies that were extant of their Writings, he burn'd them; and so was the cause of the loss of an inestimable Treasure. Thus would the *Deists* deal with the *Holy Scripture*, if it lay in their power. *Aristotle* either by the favour of having been Tutor to the Conqueror of the *Persian* Empire, or because he explained himself more intelligibly to his Disciples than he has done in his Books, got at length so far into credit, as to be reputed during many ages the Oracle of Philosophy, tho' his Physical Writings be not at this time overvalu'd: It will hardly succeed so well with our Would-be-wits, who have neither the learning nor repute of that great man. And I am sure were they altogether destitute of the helps of Christianity, and left alone to be manag'd by the *Chinese* and *Bramines*, they would quickly be puzzled and confounded.

But suppose they should be able to cope with 'em, do they mean that every vulgar capacity can do as much? Do they not know that the Christian Religion is a most pure and sublime Philosophy, and that hardly one in a thousand is fit for Metaphysical speculations; the education of most People is so mean, the weaknesses and diseases of our body are so frequent and so troublesome, the distractions of this life and its temporal concerns so unavoidable, and our passions so prone to corporeal pleasures, and so averse from spiritual meditations? These are, methinks, the chief causes, why so few men understand Christianity to the very bottom, and why the divine Revelation is so necessary. For tho' a Christian Philosopher may easily confute all the impertinent fancies of the *Manichees*, *Bramines*, *Scepticks*, *Pythagoreans*, which I have formerly alledged; yet all *Christians* cannot reach so high, nor become compleat Philosophers. And therefore God has mercifully been pleas'd to condescend so far with this weakness of ours, as to provide a shorter and surer way for our salvation, viz. the way of the divine Authority and Revelation, which he has made as plain and safe as can be desired.

This, my Lord, I shall here endeavour to prove, lest this Letter should be taken for a Sermon, instead of a Philosophical Discourse. Matters of Fact are capable of no more than an historical Demonstration, and Histories can be only demonstrated by a constant Tradition, that is, by an uninterrupted succession of witnesses from the
time

time they happened hitherto ; so that if I prove the certainty of the Divine Revelation this way, no more can be requir'd of a Christian Philosopher. It seems indeed somewhat uncertain at first sight, there being no less than 24 generations, and 2338 years between *Adam* and *Moses*, according to the *Hebrew* computation, and even 25 Generations and 3943 years, if we follow the *Septuagint*. But when we consider the long age Men liv'd to before the Flood, and some Centuries after, we find that there are no more than five witnesses, who convey'd the antient Tradition from *Adam* to *Moses*, viz. *Methuselah*, *Shem*, *Jacob*, *Levi*, and *Amram* Father to our Sacred Writer. For *Methuselah* being born the 687th year of the World, and *Adam* dying in 930, they may have convers'd together 113 years. *Methuselah* died the very year of the Flood, that is in 1656: and therefore *Shem* had been his contemporary 98 years. *Shem* was born in 1558, and lived 600 years, and *Jacob's* Birth day falling in the year 2073, it would be a wonder if this pious Patriarch had neglected, during 85 years, to inform himself of the circumstances of the Creation, but especially of the Deluge, whereof *Shem* had been an Eye-witness. *Levi* lived with *Jacob* his Father 87 years, and 37 with *Amram*. So that I may without presumption say, That the ancient tradition has been more safely convey'd from *Adam* to *Moses* during the long space of 23 Centuries, than whatever could come to us, that way, from the times of *Henry VII*. My reasons are, that men are now so short-liv'd, and so taken up with distractions and affairs, so divided into factions, so inclined to deceiving and imposing, that there is but little credit to be given to a hear-say. Besides that the use of writing, printing and publishing Histories is now so common, that the way of tradition is neglected and despised, whatsoever does not stand upon record, being accounted fabulous or at least uncertain. But the simplicity of those primitive times, the extraordinary old age to which men reached, their innocent occupations, that consisted, for the most part, in feeding their Flocks and Herds of Cattle, did naturally incline them to talking and telling Histories. And the conveniency that there was of consulting those who had been Eye-witnesses of those miraculous relations, or convers'd with Eye-witnesses, made them afraid of mixing the truth with falsehood. Or if the generality of men were already so wicked in those early days, it seems that the Family of *Eber* did not follow their ill courses, since God vouchsafed to make choice of them in the person of *Abram* to propagate the Truth, and continue his Revelation.

I know but of two Objections, that can be made against this. The first is the long lives of the Antediluvian Fathers, of which however I have given a probable account in the 2^d Letter of these *Memoirs*, p. 14. To which may be added the answer of *Jacob* to *Pharaoh*, Gen. 47. 9. *Few and evil have the days of my life been, and have not attained unto the days of the life of my Fathers.* The good Patriarch was then 130 years old, and not so decrepit, but that he lived 17 years more. He could not know, whether he should not attain to the Age of *Abraham*, 175 years; or of *Isaac* 180: So that he must needs speak in reference to the long lives of *Shem*, *Arphaxad*, *Salah*, *Eber*, with whom he might have convers'd.

The 2^d Objection is the rise of Idolatry, which began in *Abraham's* time. For how is it possible, will it be said, that *Shem*, *Arphaxad*, *Salah*, *Eber*, being still alive, and perhaps too *Ham*, *Japhet*, and many of their Sons, those great Men instructed by *Noah* himself, should have suffered superstitious practices to creep into the divine Worship, and their posterity to adore Gods of Wood, Stone or Metal, the Work of their hands? See Gen. 31. 30. *Josh.* 24. 2.

Superstition and Idolatry have had an insensible increase, as have all other corruptions, *Nemo fit derepente malus*. It was, it seems, an ancient tradition, that divers Angels or finite Spirits had the inspection of the world under God Almighty, and were the Protectors of the several Kingdoms and Families. These Guardian Angels, if we may believe the accounts of ancient Histories, did sometimes forewarn those that were committed to their care, either by distinct Voices, or by outward Signs; so that men endeavoured to please them: And as they are naturally invisible, thought it convenient, to assure themselves and their Families of their presence, by some visible tokens or representations. In process of time they came to venerate these representations, meaning that this Worship could not but be pleasing, both to their Guardian-Spirits, and to God Almighty; as relating immediately to these Angels, and mediately to the supream Deity, who had constituted them his Lieutenants. All these practices were sinful, as being introduc'd into the divine Worship, without the warrant of Revelation; and I doubt not but *Shem*, *Japhet*, *Eber*, and the other Patriarchs that were still alive opposed 'em with all their might. But is there any thing more common than to see Children despise the advice of a Great grand-Father, and prefer their new Notions to the wholesom counsels of experienc'd old age? This sort of contempt was very like to fall upon those good men, at a time that men were so long liv'd, as that Grand-Children

Children themselves had Grand-Children under them, and were the heads of numerous Families. And accordingly we see *Nimrod* with a confederate Troop of stout men, endeavouring to build a *City and Tower*, and to get a name, that is, to fix the sovereign power into their hands, (a) *Lest they should be scattered abroad upon the face of the whole Earth*, that is, to enslave the rest of mankind, to make them all resort to this their capital City, and the Seat of their Empire; so that the heads of particular Families, who were then as many petty Princes, should become their Vassals. This design seem'd outwardly well meant, and to aim at the preservation of the unity in Language and Speech, in Religion, Morals and good Manners: But whether that it was undertaken without God's Revelation, or against the Consent of the Eldest Patriarchs, or that those shrewd Politicians, to tye the vulgar the faster, had mixed with the divine Worship, some new bewitching conceits and dazzling Ceremonies, as the Worship of Angels, and of deceased Men: However it be, this Undertaking did not prosper, for by God's appointment, there arose dissensions amongst 'em, so that they went from each other dissatisfy'd. I am apt to look upon *Nimrod* as one of the chief Managers of the business. 1. Because he is call'd (b) *a mighty Hunter before the Lord*: Now in those primitive times, *Hunting* was a quality necessarily requisite in Heroes and great Warriors, forasmuch as men being few in number, Wild Beasts were very troublesom to them, which appears by the instances of *Hercules*, *Theseus*, &c. 2. Because 'tis added immediately after, *That the Beginning of his Kingdom was Babel, Erech, Accad and Calneh*, four Cities situated in the share of *Assur*, whom he drove from thence, tho *Assur* himself was a powerful Prince, and even after his expulsion built four great Cities. These Conquests *Nimrod* seems to have made with the remnants of the scatter'd Founders of *Babel*.

Whatever be of these conjectures, Idolatry spread not so fast, as is commonly imagined, over the face of the Earth. For there can be no communication between light and darkness, and God was pleased to communicate with men, that were not of *Eber's* Family, even till the times of *Moses*, as with *Abimelech* King of *Guerar*, *Pharaoh* King of *Agypt*, *Melchisedec*, *Job*, *Jethro*, *Balaam*. It's not easy to fix the period when this communication ceas'd, but for what reasons it did so, is very plain to me, as I might make it appear, did not the method and design of these *Memoirs* force me to put an end to this Letter. And therefore I shall conclude in contradiction to our Deist, that *Revealed Religion was once and even twice the Religion of all the world*, viz. from the Creation till after the death of *Adam*,

when the *Cainites* having enslav'd the Posterity of *Seth* by Marriages began to tyrannize over the earth, and to corrupt Religion and good Morals, lest the *Sethites* should acknowledge their error and break their Fetters. The second period is but of four or five Centuries, from *Noah* to *Nimrod*; but from *Nimrod* to *Moses*, true Religion and Idolatry were mix'd, the former decaying apace, and the latter growing up, till they were intirely separated, and God's worship preserved amongst the *Israelites*.

This will suffice for the present, in answer to our Deist; for at your Lordship's command, or pious mens desire, I shall always be ready to take again this matter in hand, or any other of the like nature.

July, 20.

LETTER XXVI.

To the Author of these *Memoirs*, by
Mr. R. Sault, Mathematician.

ARGUMENT.

Containing a Geometrical Demonstration of the Infinite Divisibility of Matter.

Reverend Sir,

IN perusing your *MEMOIRS for the INGENIOUS*, for the Month of *May* last, I find too great a complement in the prefatory part of your Letter to me, and I write this on purpose to undeceive such as do not know me, and to assure those that do, that as the Character was neither my seeking nor desert, so also not my pretensions; especially in the former part thereof, I mean Philosophy. The latter part indeed I have too fair a prospect of, not to endeavour a considerable progress in it, my Interest and Ambition pushing me on, tho I would believe that they are both superseded by the

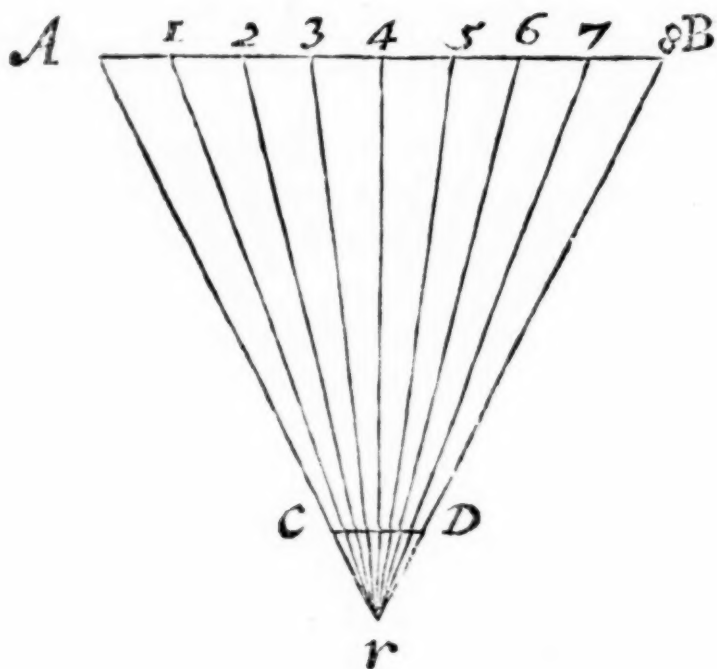
the hopes I have of doing good and being useful in my Calling. Philosophy in the common acceptation is a perfect jest to me, and I never use it, but when I have a mind to unbend my thoughts from those severe applications wherein my *Profession* and Natural Constitution, do sometimes involve me a little too far: I would not be mistaken, as that I should decry Experimental Philosophy, or even such Theories as are capable of a Demonstration upon admitting the first Principles of solid reasoning for *Postulates*; this I think worthy of every wise man's application, in some measure or other, since in every step there are visible delineations of a *Divine Intelligence*, in whom all just and proper Ideas of things do happily terminate.

I have considered your Notions of *Effluvia*, and, not to be rude to my Friend, I think they are very natural to a *Cartesian*, and under that Character worthy their Author: I shall spare my thoughts as to particulars, since I am no *Cartesian* myself, for I can't admit (when I am in the admitting humour) that *Matter* should be subtiliz'd so far as to lose its nature; I mean more particularly as to *extension* and *figure*; tho I am as far on the other hand from the *Aristotelian Occult Qualities*, which is their last refuge for the solving the more mysterious *Phenomena* of Nature. Why there should be so many hot zealous Heretics in Philosophy, or how any thinking man can pardon himself for spending a deal of thought and time about such useless enquiries, I know not. 'Tis easy to start one of these speculations, and treat of it with much learning and acuteness, but with little satisfaction to a man that is in the pursuit of truth and demonstration.

Our Ideas of Matter and its accidents are very distinct and adequate in the abstract; I can very easily conceive how a line of a quarter of an Inch may be exactly divided into a Thousand parts, and each of these subdivided into a Thousand more; but when I come to involve this Idea of division and subdivision in Matter, I'm at a loss, and should find it a difficult undertaking to divide this quarter of an Inch into five Hundred parts, or how to make any two parts precisely equal in all respects. This consideration has suggested to me, that God Almighty's operations in Matter are exactly analogous to our conceptions in the abstract, (which by the way argues our Souls to be of divine Extraction.) We have a true Idea of the sharpness of the Sting of a Bee, or of a Nettle, and when we examine these with the finest Microscope, we find they terminate according to the Idea we have of them; But when we look upon a Needles point (our own operation) how craggy and blunt

blunt it does appear ! We have a true notion of Smoothness, and find it in the scales of a Flea and other crustaceous Insects ; but our finest Glass, or polisht Marble is so extreamly rough and uneven, that the eminencies will reflect the light, as the sides of rising Hills and Mountains do.

But I have digrest too far, my first design being to demonstrate the *infinite divisibility of Matter*, or that Matter in its own nature can never be divided so small as not to admit of subdivision : This subject has been reviv'd and managed pretty smartly alate in Town, and finding new difficulties started, I have concluded with myself, that perhaps one good demonstration (and I suppose the subject will bear it) may possibly stifle it again, and set these Gentlemen upon the pursuit of some nobler and newer Hypothesis ; I shall desire no other *Postulate* but what has been granted by all that pretend to understand demonstration, *viz.* That 'tis possible to draw a right line from one point to another.



Let the right line *AB* be divided into such a number of parts beyond which there is no farther division, suppose into 8. Let *CD* be a line of the same nature and properties in every respect with *AB* only 6 times shorter ; draw the lines (*per post.*) *Ar, 1r, 2r, &c.* its evident that the line *CD* shall be cut 8 times, that is, as often as the line *AB*. But by Hypothesis the line *CD* is of the same nature and properties as *AB*, therefore *AB* may be divided proportionably with the line *CD*, *viz.* into 6×8 or 48 divisions, equal to 8 divisions, which is absurd. If yet it be urg'd, that 48 divisions is the

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the number beyond which the line A B cannot be divided; make these 48 divisions, and draw the lines Ar, 1r, 2r, and so on to 48r, 'tis evident that the line C D will be also divided into 48 parts, which being of the same nature and properties with the line A B, the line A B will be capable of 48×6 , or 288 divisions, which drawn to r as before will divide the line C D into 288 parts, but $6 \times 288 = 1728$ parts for the line A B, and so on *ad infinitum*, which was to be demonstrated; the latter part of this demonstration, is a demonstration by *Induction*, used by Dr. Wallis in his *Arithmetic of Infinites*, and now admitted universally, both at home and abroad.

July, 22.

LETTER XXVII.

To Mr. Sault Mathematician, in Adam's Court, Broadstreet.

ARGUMENT.

That there is no such thing in nature as Mathematical Points. The Difference betwixt a Mathematical and Physical Division. That Matter is not really or Physically divisible in Infinitum demonstrated. That neither the Extensibility of Gold, nor Plants and Animals delineated in their Seeds do prove this Infinite Divisibility. Instances of Geometrical Demonstrations stretched too far. Wherein lies the Mistake of the foregoing Demonstration.

S I R,

1. **B**Y your ingenious Letter, you have done just as those fair Ladies, who answer the complements their Lovers pass up on their beauty, with such a modest and lively blush, that it makes them the more admired: You have excused your self from being a Philosopher with so uncommon observations, that were not your dealings fairer in the ordinary occasions of life, I would not have
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for you as high an esteem as I have. And therefore I can hardly think that you should earnestly intend to prove by your Demonstration that Matter is really and in it self infinitely divisible. You know, Sir, that there is *no such thing in nature as a Mathematical point*, that is, a body so small as to have neither length, breadth nor depth; for then it had neither extension nor impenetrability, and it would cease to be a body, even in the sense of all Philosophers whatsoever. Of such points, I grant, there can be an infinity in the smallest atom imaginable, because they are nothing real, besides the various contemplations of a mind, which derives its extraction from the Divine Intelligence, and is created to admire and search into the infinite perfections of God during all Eternity.

2. There is then a great difference betwixt a Mathematical and Physical Division. By the former, the ten thousandth part of an inch may be divided into innumerable parts, because those parts have no extension, and consequently are no bodies at all: But the division performed the latter way has its limits, which are not the more uncertain, because unknown to us.

3. To demonstrate this real difference betwixt a Mathematical and Physical division, as far as I am able by the little insight I have in Philosophy and Mathematicks, I shall only suppose that common Axiom, *The whole is greater than any of its parts*, with the ordinary definitions of Body and Infinite, *viz. Body is a substance extended and solid or Impenetrable; Infinite is that beyond which there is nothing, or to which nothing can be added*. This being granted, which not one, for ought I know, can deny; I argue thus: In your Scheme the Lines A B and C D, suppos'd to be of the same nature and properties, are either Mathematical lines consisting of Mathematical points, that have no extension at all, or are corporeal lines made up of Physical points, that is, of particles extended and solid: If the first, your Demonstration proves nothing in relation to Physicks, since they are not Physical lines that are thus divided; but only Mathematical, that is, your Division is not real, but imaginary or intellectual; it being not performed on any body, but only within your mind. If the second, I urge thus: By your hypothesis, tho the lines A B and C D be of the same nature and properties, yet A B is six times longer than C D, and therefore both cannot be infinite nor infinitely divided. The consequence is plain, *Infinite is that beyond which there is nothing, or to which nothing can be added*; but six parts of A B can be added to C D, or C D must be multiply'd six times before it can be equal to A B, and therefore C D cannot be infinite. Now that such a portion of Matter as is not infinite in
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itself, cannot be infinitely divided, needs, methinks, no demonstration; however, if you please, I may prove it thus: If CD , the sixth part of AB , can be infinitely divided, CD the sixth part, is equal to the whole AB , which cannot be more than infinitely divided; but the whole is greater than any of its parts, and therefore if AB can be infinitely divided, CD , the sixth part of AB , cannot be infinitely divided, unless you would say that one Infinite can be greater than another, against the very notion and definition of Infinite, that it is *that beyond which there is nothing, or to which nothing can be added*; whereas six parts of the supposed infinite line AB can be added to the suppos'd infinite line CD .

4. If to this, you be pleas'd to add what I endeavour'd to prove in the X Letter of these *Memoirs*, p. 63, and 64, that the least particles of Matter cannot be fluid and flexible, but must needs be solid and rigid corpuscles, and consequently that the subtil matter of *Descartes* is a meer figment; you will be apt to believe that there is really no such thing as an infinite Divisibility of Matter, no more than an infinite corporeal extension. Infinity is an essential and incommunicable property of the Supream Being, of which he has been pleas'd to give us some notion, and to print in us an earnest desire of its contemplation. But some men are so misguided by passions and prejudices, that they will rather suppose a pretended infinity in the smallest Atom imaginable, than to acknowledge the Eternal, Supream and Infinite Being.

I know the incredible extensibility of Gold, and I may even grant to *F. Malebranche*, that God could, if he would, frame a World as distinct as ours, with a Sun and Seven Planets turning about it, and all sorts of Creatures that are in them, within the space of a Ball of a quarter of an inch diameter. I grant this, I say, because my Reason and good Microscopes assure me, that Plants and Animals are delineated in their Seeds, and have all those very parts, which come by the increase to exert themselves, and to grow sensible to the Eyes, how small and inform soever these Seeds may appear at first; and whatever be the changes through which they pass. But after all, there could never be as many particles in that suppos'd little World, as there are in this real one, unless the clearest Ideas we have, *viz.* those of Numbers and the Multiplication of Unities were false or doubtful: Neither can there be any proportion between finite and infinite, tho we should multiply numbers, or make additions of portions of Matter, during all Eternity.

5. But can then a Geometrical Demonstration be false? no, but it can be stretched too far. Geometricians suppose points that have no extension at all, Lines made up of those points extended in length, but without any breadth or depth. I grant an infinity of such Lines may be drawn from an infinity of such imaginary Mathematical points, to any such others; because you draw them not upon Paper or any corporeal substance, but within your Mind, that is altogether Spiritual, as well as your Idea's. And that would have appear'd even to the Eye, had you undertaken to draw the 48, 288, or 1728 Lines or Divisions whereof you speak.

6. Those great Mathematicians and Philosophers, *Robault*, *Arnaud*, *Mallebranche*, are methinks fallen into the like mistakes, endeavouring to prove their pretended Divisibility of Matter by demonstrations of this nature. However this does not make Geometry uncertain, it being not the fault of the Art, but of the Artift. Thus in Mechanicks, Mathematicians suppose Matter without gravity, and equal in all its parts; which suppositions are necessary to make their Demonstrations plain and easie. But as there is no such Matter in the World, it oft happens that a vast number of unforeseen difficulties arise, when they will put their speculations into practice. And even those who have made, as they imagine, a competent allowance for this gravity and various complications, see oft new difficulties starting on a sudden.

7. You tell me, Sir, you are no *Cartesian*; and therefore I would not have you seduc'd into a mistake by the specious pretence of a Mathematical Demonstration. I know there is the greatest certainty in them, provided they be rightly apply'd, and all equivocation whatever carefully avoided, which, by your leave, Sir, seems not to be so in yours. For by the institution of Geometricians, the word *point* is a *purum Ens Rationis*, the Mathematical supposition of a Body so small as to be consider'd without any relation to its three Dimensions: and likewise a right line is supposed to be a Body extended in length, without any breadth or depth. Keep to this your Geometrical sense, and I'll grant your *postulate*. But if you pretend that it is possible, at any time, to draw a right physical, real or corporeal line from any one physical point to any other, I beg that you will be pleased to prove it; promising you that when you have taken that trouble, I shall be ready to admit the infinite Divisibility of Matter. In the mean while I have an Argument, which I am resolv'd to stick by, *viz.* That since all the parts taken together can be but equal to the whole, whenever I shall see a portion of Matter terminated on all sides, I may safely conclude that it does not contain an infinite number of parts.

As

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As to the commendation you bestow upon me of being a *Cartesian*, if the Disciples of the great *Descartes* will allow of it, after they have read my *Works of the Learned*, Art. v. p. 13. and Art. xxxvii. p. 123, together with these *Memoirs*, Lett. iii, x, xiii and xv; I am content to give them the Hand of Fraternity.

July, 2^d.

LETTER XXVIII.

To the Author of these *Memoirs*, by
Mr. R. Sault, Mathematician.

ARGUMENT.

A Defence of the Position contained in the XXVI Letter, That Matter in its own Nature is infinitely Divisible. Objections against the Corpuscularian Philosophers.

Reverend Sir,

I Take it extream kindly at your hands, that you were pleased to send me what you have design'd as an Answer to my short Letter, before it was committed to the Press, and I shall endeavour to clear those Philosophical Objections that you have made, not so much for the sake of Contest, as the Reputation of a Mathematical Truth.

§ 1. As previous to your attack, you tell me, That *I know there's no such a thing in Nature as a Mathematical Point, that is, a Body so small as to have neither length, breadth nor depth, for then it would neither have extension nor impenetrability, and would cease to be a Body*, which I grant, and desire you to remember it hereafter. We call any Quantity a Mathematical Point how big soever, provided we conceive it without distinguishing its parts; far differing from that of *Zeno*: And by a line (to prevent another definition of it) we conceive a Quantity made by

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the motion of such a Point. See your own Countrymen *De Chales, Paradise, &c.* should we say any thing else we should speak unintelligibly, and instead of having certainly Mathematick Operations, we should be at a loss in the very Elements.

§ II. In your second Paragraph, you tell me *there's a deal of difference betwixt a Mathematical and Physical Division*, which I also subscribe to.

§ III. In your third, you proceed to demonstrate it; and put this Dilemma upon me, viz. *either my Lines AB and CD are made up of Mathematical Points or Physical*; If the first, the Division will be only imaginary or intellectual, being not to be perform'd on a Body but within ones Mind, and therefore (for I'll make the omitted Consequence) my Actual Mathematical Division proves nothing to the purpose. If the second, *AB being six times longer, that DC both can't be infinite nor infinitely divided, for (as you add afterward) infinite is that beyond which there is no dividing, but CD may be multiplied six times before it can be equal to AB.* Therefore *CD is not infinite if AB be infinite, unless the part is equal to the whole, or some infinities greater than others.* This Sir, is the strength of your Argument in a little shorter terms. To all which I answer. If you had duly considered my position, you would have found these words, *my first design being to demonstrate the infinite divisibility of matter, or that matter in its own nature, can never be divided so small as not to admit of subdivision*; thereby explaining what I meant by an infinite indivisibility of matter, and the Term in its own nature is as Physical an expression as I can use, if I were to make a second choice of my words, so that the former part of your Dilemma is needless. In the second part you palm upon me a fresh word infinite, taking it for granted that I had affirm'd that either one or both of the lines were infinite; then you define what infinite means, and upon a *Petitio Quæstionis*, you fall a concluding, that if so, then *the whole is equal to its parts, and one infinite greater than another.* Now Sir, I hope there's a very comfortable distinction for me, betwixt a thing that is Physically infinite, and a finite thing infinitely divisible; 'tis plain to me that whatever is infinite is not divisible at all; for divisibility supposes parts, but partibility and infinity were inconsistent terms when I studied Philosophy; but what is finite in its own nature, is also in its own nature capable of an infinite division, from my first demonstration.

§ IV. But since you are pleased to correct my Error, as to your being a Cartesian, affirming your self to have imbib'd more of the *Corpuscularian Principles*, I may undertake to prove from thole also that my assertion is valid: You were pleased to tell me in Paragraph

1st which I desired you to remember, that *there was no such thing in Nature as a Mathematical Point, or a Body so small as to have neither length, breadth, nor depth*; and in Paragraph 4th the least Particles of matter must needs be rigid Corpuscles, which exactly agrees with what I have said in my former Letter, viz. *I can't admit that Matter should be subtilized so far as to lose its Nature, I mean particularly as to extension and figure*. Now I affirm that your least particles of matter which you call Corpuscles, are of some sort of figure, as Cones, Cubes, Cylinders, Pyramids, regular or irregular; you suppose 'em rigid and pointed, if so, they have sharp Corners, but these Corners are less than the whole Corpuscle, and if separated from it there remains perhaps a Globular figure or some other, for you must admit the Accident of figure, or else Corpuscular Philosophy falls to the Ground and with it the Definition of matter it self. Now Sir (to let Mathematics alone) this whole Corpuscle or little tiny diminutive Body is extended (according to your own Definition of *Body*, Paragraph 3.) if extended (according to the Idea which all the world has of extension) it has parts equal to the whole, if parts divisible, if divisible, it's all that I contend for. I matter not whether Matter is actually divided or no, but whether it is divisible in its own nature is what I contend for; besides, amongst all our Modern Philosophers, *Passive and divisible* makes up a considerable part of the definition of *Matter*, which also secures my Assertion.

I could proceed to prove what I have asserted Mathematically, as that the two sides of a Triangle must be equal to one, whenever CD is not cut into as many parts as AB, and by a hundred more absurdities too tedious, and indeed useless to enumerate; but my way of proving it by Induction is what I insist most upon, because I see that it obviates all the Philosophical distinctions that can be made; and 'tis (I must repeat it once more) what the greatest Modern Mathematicians have admitted, as Dr. Wallis, Mr. Newton; and abroad, Bullialdus and others.

I might have consider'd what you have urg'd in the 6th and 7th Paragraphs, but they all depend upon the 4th, which, I hope, is fully answered. Only I can't but think it a hardship upon me to be call'd upon to prove one of *Euclid's Postulates*, as *the possibility of drawing a right line from one point to another*: Which I beg the liberty to think as evident already as Motion, which must be either in Curve or Right Lines, &c. and if one is possible, then both, from the same principle; if neither, there is no such thing as Motion, and so we may be put to prove principles *ad infinitum*; but to prove without some Axioms and Postulates to build upon, is what I dare not undertake.

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I don't know whether in the great haste I wrote this, I may have let any thing fall unbecoming my own Character to give, or yours to receive; if I have, I desire to be excus'd, since I have done nothing of that nature maliciously or designedly: and I doubt not but I have light of such a Judge (tho my opponent in this case) as is not only capable of making a true judgment of this Defence, which is more Philosophical, and by consequence more your Province; but also one that thinks it no disgrace to subscribe a truth tho to an Enemy; and such a one as is, and always shall be Ambitious of testifying how much I am

July 25.

Reverend Sir,
Your Faithful Humble Servant,
R. S.

LETTER XXIX.

To Mr. Sault Mathematician.

ARGUMENT.

An Answer to the foregoing Letter. The Definitions of Mathematical Points and Lines, and of Infinite cleared off, and Euclid justified. Objections against the Corpuscularian Philosophers answered. The first Elements are most minute Globules. Why Matter is contiguous? Descartes, Malebranche, and Gassendi confuted. The Author's Hypothesis.

S I R,

I. **I** See our dispute is at an end as to the Geometrical part, since I need but to clear my definitions of Mathematical points, lines and infinite, which is not very difficult to do; for the first are taken out of Euclid (a): *A point is that which has no part: A line is a length without breadth.* These very words shew there is really no such thing in nature as Mathematical points and lines; and both the comment you make upon them, and that of *Dechales*, to which you

(a) Defin.
1, 2. 1.

you refer me, confirm me in my opinion, that your Mathematical points and lines are not things really extant, but suppositions made at pleasure, as oft as you have occasion for them. For you say we call any quantity a *Mathematical point*, how big soever, provided we conceive it without distinguishing its parts, and by a line we conceive a quantity made by the motion of such a point.

To be plain with you Sir, good old *Euclid* was more sincere than you Gentlemen his Interpreters, and perhaps more cautious; for he owns almost in express words, that his points and lines are not real things, but he involves himself in no contradiction, since he draws, for ought I know, no physical inference from his Geometrical definitions. It's not so with you, Sir, For let your line *AB* be divided into ten thousand parts, if possible; so that a suppos'd Mathematical point in the line *AB* be the ten thousandth part of it: let a right line be drawn from each of these points to *r*; if each of those lines cut the line *CD*, as they must in your hypothesis, the line *CD* being six times shorter than the line *AB*, it clearly follows that your Definitions are false, or liable to a plain contradiction. For then a *Mathematical point* cannot be any quantity, how big soever, nor a line a quantity made by the motion of such a point; unless you admit the penetrability of Matter as great an absurdity as any of them all.

II. You seem to avoid them by owning that *there is a deal of difference betwixt a Mathematical and a Physical Division*. But granting this absolutely, as you do, it will follow that a Mathematical Division being nothing else besides a sport of our Mind, that is created for God, or to live eternally, and uses the power it has receiv'd from him of contemplating Infinite, as I may say by parts, in dividing Matter till it be wearied out; then your Geometrical Demonstration will signifie nothing, because it's apply'd to a physical or real thing, or because you intend to prove that *Matter in its own nature is infinitely divisible*.

III. As to my definition of *Infinite*, I did not say it's that *beyond which there is no dividing*, as you are pleas'd to quote me; but it's that *beyond which there is nothing, or to which nothing can be added*. I consider'd my self as in the center of that Infinite all, and looking round about me on all sides, I saw no end where-ever I cast the eyes of my understanding, and therefore I concluded *Infinite is that beyond which there is nothing*: and I appeal yet to the conscience of all mankind, whether this is not the true notion of Infinite. The Definition of *Aristotle* (b) that *Infinite is ὅ αὐτὸ ἔχει ἑσθλόν*, that *whereof there is always something behind*, differs only from mine in that his gives with

(b) *Ph. 1. 3.*
positive

positive words a negative Idea of Infinity ; whereas mine with negative words affords as positive an Idea of it as can be conceiv'd.

I leave the Reader to judge of your answer to my Dilemma's. I shall only observe that your distinction is not so comfortable as you suppose. For tho I willingly grant you, that *whatever is infinite is not divisible at all* ; yet it follows not, either from thence, or from your first demonstration, that *what is finite in its own nature is also in its own nature capable of an infinite division*, until you have prov'd that a finite body can contain an infinity of parts, without destroying that common notion *the whole and all its parts are equal*.

IV. I come now to your objections against the corpuscularian principles, which, if I conceive them right, may be reduc'd to these two heads. 1. That the least particles of bodies must needs have some figure or other, either regular or irregular ; if so, then the corners of these particles will be less than the whole particle, and therefore may be separated from it. 2. The least corpuscle in the world is extended ; if extended then it has parts equal to the whole, if parts divisible, if divisible, you have all what you desire ; for you care not whether Matter is actually divided or no, but whether it is divisible in its own nature, is what you contend for.

To this I answer, 1. That the least particles of Bodies are so small, that there is no Agent in nature that can make 'em smaller, or divide them farther, which must necessarily be so, if matter be not infinitely divisible, as I contend, or rather if the whole and all its parts be equal, that is, both finite. 2. And therefore, tho these particles be extended and have parts, yet it follows not that they are separable, no more than the parts of the infinite space, which you own to be indivisible in its own nature, § III. The same reason holds in both, for divisibility and the utmost minuteness are as inconsistent terms as *partibility* and *infinity*. 3. I am not bound to suppose the first Elements or least Corpuscles angular, I may conceive them perfect globules, for this figure joyn'd to their unimaginable smallness, will give no hold to exterior Agents.

But here rises a new difficulty, how can will you say, these globules hang together, since they touch one another but at some points of their superficies ? Sir, this objection does not hit me more than other Philosophers, for do you know of any, who ever gave you a satisfactory account of the contiguity of matter ? 1. The Rest of *Descartes* will not do, for besides that Rest is not a positive and efficacious quality : To say that Bodies are hard or contiguous, because their parts are in rest one by the other, is to say one and the same thing in different words. 2. The subtil matter, which *Malebranche* means

to employ more successfully, can't make it up neither. For passing through all the pores of Bodies as a most subtle and movable substance, it is fitter to separate 'em, than to keep them united; besides, what shall keep together the first particles of the subtil matter? If he say they remain united because of the plenitude of the World, or because there is no empty room for them to fall asunder; by the same reason I shall prove that motion is impossible (a), and consequently that his Hypothesis is false, since we are conscious to our selves ⁽¹⁾ See Lett. 3. of our own motions, and of those of several bodies. 3. Let's now hear *Gassendi* and the Modern *Epicureans*. Bodies, say they, hang together, because the first Elements are angular Corpuscles of various figures, more or less firmly complicated, according to the degrees of compactness in different Bodies. But if these angular corpuscles are of various figures, they are also most probably of different size; if so, then they can act one upon another, break mutually their corners, and render each other lesser; so that they cannot be indivisible nor consequently the first Elements. 4. What if we should say that the minutest globules are viscous? No, this cannot be; for clamminess seems to be a quality of compounded bodies, and to proceed from branched particles. 5. What then? pray, Sir, look; I have it, if I am not much mistaken. Matter is contiguous, because the World, (I speak of this terraqueous Globe, for of the rest I know nothing, but by uncertain conjectures) the World, I say, is as full as it ever can hold, or rather as it can consist with the various constitution of bodies; so that the minutest globules cannot find vacuities so big, as to suffer them to fall totally asunder, or to disperse and go very far from each other. However this does not hinder motion, condensation, and dilatation. 1. Because the empty spaces, interspersed among the first globules, may allow them to move about each other, whensoever they are forc'd to it by an exterior agent. 2. Because no sensible body is made up immediately of the minutest globules, but of other angular corpuscles, and this of others again; not *in infinitum*, but I am sure there must needs be made a vast number of subdivisions, before one could come to the first Elements. And therefore as these angular corpuscles passing through so many and various combinations must needs be complicated different ways; there is no difficulty in this Hypothesis to explain the several degrees of hardness and softness, compactness, and fluidity, condensation, dilatation, &c.

§ V. For the rest, Sir, I am too civil for putting you to those hard shifts of proving one of *Euclid's Postulates*, viz. the possibility of drawing a right line from one point to another; provided you draw no

Physical inference from a Mathematical supposition. Nay, I have so good an opinion both of you and your demonstration, that I am almost sure, I could find as much to say against any other whatsoever; tho it were set up, even by the famous *Wallis* and *Newton*; because I am confident there is no such thing in Nature, as the infinite Divisibility of a finite Substance.

July, 26.

LETTER XXX.

To the Honoured Mr. *Josepb Raphsen*,
Fellow of the *Royal Society*.

ARGUMENT.

The Author's Excuse for not putting his Name to Translations. An Account of a Woman that took Worms out of the Gums, Tongue and Face of several Persons. That these Worms breed in great Numbers, Rottenness of Teeth, Canker and Ulcers produced by them. An Account of Sir Theodore de Mayerne. That there is no equivocal Generation. That these Worms came out of Eggs of Flies, proved by an incontestable Instance. That all flying Insects have been of Worms, but all Worms do not become Insects.

Honoured Sir,

IF my present circumstances would allow to keep my Works by me, that I might review them at leisure hours, till I brought them somewhat near the perfection that *Vangelas*, *D' Ablancourt*, and *Sir Roger L' Estrange* have given to their Translations, I would not stick to prefix my name to them. But being reduc'd to the unhappy State of *Du Ryer*, you will not, I hope, be offended, if I durst not
subscribe

subscribe my name to such an inconsiderable trifle as the *Latin Translation of Robaults Mechanics*. For tho it be an excellent Treatise in itself, and worthy in that respect to be dedicated to so great a Mathematician as you are: yet 'tis accounted so mean a thing to translate out of *French* into modern *Latin*, that a man who has any sense of honour will never boast of a performance of this nature.

Sir, tho these *Memoirs* be in my Judgment as tolerable as any thing I ever writ, yet are they very far both as to the Stile and the Matter, from that Ideal Perfection I would give them: neither may I hope with the few helps, leisure and encouragements I have, to make them much more compleat than they are; so that I know not whether I had not as good to desist. And I was like to have left off this Month, being discouraged by my Booksellers, had not a worthy and learned Physician, a Fellow of your Society, Sir *Theodore De Vaux*, communicated to me some of his, and his incomparable Godfather Sir *Theodore Tärquet de Mayerne's* Observations, with promise of helping me to others no less curious from time to time. This kindness was the more acceptable to me, that it was altogether unsought and unexpected. And now having so great a prospect for Physic, I am minded to try whether I cannot prevail with other ingenious Acquaintances for other things, especially with you, Sir, who have such an universal Learning in all the parts of Mathematics and Philosophy, and have penetrated into the most secret recesses of *Algebra*.

The Observation I shall now communicate to the World under your name is, methinks, pretty uncommon. A Woman called *Sarah Hastings*, living at *Holm* in *Huntingdonshire*, a Mile from *Stilton*, had attained to so great a skill, as to discern at first Sight, whether any Person had Worms great or small in his Gums, Tongue or Face. These Worms, as she affirmed, are the cause of the Rotteness of the Teeth, of Pustules and many other Putrefactions, as shall appear hereafter. She drew them out of any part soever in three or four minutes, using only the Quill of a Goose, or Writing Pen, sharp pointed, or cut as a Tooth-picker; she pierc'd the afflicted part so dexterously with her Quill, that the Pain was almost insensible: Then she threw the extracted Worms into a Glass of clean Water, where they appear'd to have a round and red head, the rest of the body being white.

All this Sir *Theodore de Mayerne* himself, saw this Woman perform, at *Whitehall*, in K. *Charles I.* presence, in the year 1642, as I have it under his Hand and Cifer. She was then 65 years of Age, and had communicated her Art to none but her Daughter, who

was already grown to be almost as exquisite as her Mother. I know not of any Author, who has mentioned any of these Women, who yet deserv'd so well to be remembred to Posterity. The Mother is apparently dead, but I should be glad to know what's become of the Daughter, whether she is dead too, and that important Secret with her?

To convince the World of the Usefulness of these Women's Skill, I need but transcribe the accounts which a Friend of Mr. *De Mayerne* sent him, in a Letter that I have in Original, dated *December 14, 1641*, and subscribed *J. De Laval*.

'The first time I saw her try her Skill, says my Author, was about
'16 years since at the late Earl of *Bullingbrook's*, at *Bletso* in *Bedfordshire*, where upon the first inspection of the Mouths of divers Persons, she instantly declared who had, and who had no Worms, which she with an admirable dexterity took out with a Quill. They were so small as that they would not appear, till they were put in water, and there they might be plainly discerned to stir; some of them being as small as threads, and yet their annular fibres by which they moved, were very visible. At that time a Daughter of the Lord *S. John*, Son to the said Earl, had on her nether Lip a red spot, which sometimes would be pustulous, but for the most part, appeared only as the seat of a small Wart. The *Operatrix* no sooner spy'd this Lady, but she assured her Father that it was a Worm, and if not prevented, that it would breed and become an Ulcer; whereupon my Lord was perswaded to let her take it out. To avoid all pretence of Legerdemain, a new Quill was prepared and made fit by my Lord himself, and put into her hands by him, with which, she in a trice discover'd the place where a Worm was lodged in the flesh, which before she took it out did evidently appear to us all that were present; and after she had pull'd it out was alive, and crept very nimbly upon a Plate; it being white with a red head, very like to, and almost as large as that which is found in a Nut. The Lady's Lip was perfectly well within three days after, no sign at all appearing, where the Worm had layn.

'The next operation of hers, which I had the fortune to view, was upon on *Thomas Stedams*, a Lieutenant, who about 7 years since was quartered at my House. He had been long troubled with a sore Throat, as he called it; one day as the Surgeon of the Regiment was dressing him, I happened to see the place affected. His Tongue was in some places very raw, and seem'd to be much inflamed. There were many bleakish pustula's towards the root
' of

of the Tongue; betwixt which, the flesh appeared black like a Scar. All the Medicines applied by the Surgeon did rather increase, than any ways assuage the grief, which was accompanied with most exquisite pain, especially during the time of dressing. In fine, all remedies being fruitless, I persuaded him to send for this Operatrix; who upon the first view told us, that the whole disease was Canker-worms, as she call'd them, which were suffer'd to breed in that part, and by the application of Physicks contrary to them, but not powerful enough to exterminate them, were driven towards, or into his Throat: where, if they were not without the reach of her Quill, she would destroy them. And accordingly, she endeavour'd to do it, and in my own presence, did at several times take out with her Quill to the number of 27 Worms, many of which I have seen half within and half without the flesh; and being taken out they appeared as big as large Maggots, being all white with red heads as the others above mention'd. The part of the Tongue from which they had been taken grew in few days whole, and without any excoriation or pustula's. But a bed of the said Worms being, as she said beyond the reach of her Quill, she was forced to give over the cure, telling us that in a short time those Worms would eat his Throat in pieces, which accordingly ensued, together with the death of the Patient, few Weeks after his departure from my House.

The third experiment I had of her skill was upon myself. Almost three years since, towards the end of Autumn; the third great Tooth in my nether-jaw, on the right side, was seized for divers days together, with a stupor, or that kind of pain, which we call the Teeth set on edge, so that I could not endure to chew on that side. This having continued a month without intermission, the Tooth became sore and very loose, which about the beginning of *December* turned to an excessive aking, that tormented me most immediately after Meals. This gave me suspicion, that it might be occasioned by somewhat extraordinary, whereupon I repaired to this Woman. As soon as she look'd in my mouth, she told me my Gums were very foul, but that she did not certainly know, whether the pain proceeded from a Worm or no, which yet she should quickly discover, if I would hold a while a little Aniseed water in my mouth. I did it, and she having look'd again in my mouth, told me, that it was a Worm or two lodged just under the Tooth affected. And therefore I desired her to shew her Art upon it, which she did, and finished the cure in less than four minutes, having first with her Quill only discovered to some Gen-
tlemen

‘clermen, that were with me, the worms half lodg’d in the Gums under the Tooth, which being taken out crept upon a Trencher, being of the same size and colour before express’d. Immediately the pain ceas’d, and the Tooth in few days became fast, nor have I ever since been troubled with any pain in that Tooth, tho in some of the other side I have.

‘I saw a fourth Experiment in *March* last, upon one Mr. *Posthumus Gannock*, a Gentleman, who by a fall had broke the flesh on the ridge of his Nose, which by several accidents was twice or thrice renew’d before it could be perfectly skinn’d over. This occasion’d a great tenderness and discolouring on the place affected, which after a years time turned to a plain sore, whereupon, all other remedies proving fruitless, I perswaded him to go with me to this woman it being then about the middle of *January*. As soon as she saw it, she told us, it was not yet ripe for cure, the worm not being come to perfection, and so dismiss’d us, desiring the Gentleman to come again in *March* following, as he did. Then she took out two such worms, as I have before described, and the sore became quickly whole, without any application whatsoever.

‘I could give you some other relations of the same kind upon my own experiment, but I shall only add one more concerning a Maid of about 10 years of age, named *Mary Barker*, who from one small Pustule in her Lip, had all her face overspread with a very foul Ulcer, that had eaten into her Nose and Cheeks. She had been under the cure of two excellent Surgeons, but could find no remedy, till this woman took her in hand, and got her perfectly cured within six Months, by taking above sixty worms out of her Face at several times, without using any outward Physick. The affected parts appear’d only, as tho she had been much pitted and spoil’d with the small Pox.

I can give no account of this Mr. *Delaval*, only as far as I can judge by the spelling and style, in which I have made but inconsiderable changes, he was a Letter’d man, and perhaps a Physician too. But the witness I most rely upon is Sir *Theodore De Mayerne*, a man too knowing to be deceiv’d, and too sincere to impose upon others. He was Son to *Lewis Turquet De Mayerne*, who has written the History of *Spain*, and was Lieutenant General of the Ordinance to *Henry IV.* But that Prince preferring the peaceable possession of the *French Crown* before his Religion, many Protestants deserted his Service, amongst others Lieutenant General *De Mayerne*, who retired to *Geneve* where our Author was born in 1597.

He took his degrees at *Montpellier*, then came to practice Physic at

at *Paris*, where in a short time he got so great a name, that he was honour'd with the quality of Physician in ordinary to K. *Lewis XIII.* In 1621, he was called into *England* by King *James I.* made his first Physician, as also to Queen *Ann*, then to King *Charles I.* his Queen and all the Royal Family; besides that he was consulted by many Kings and Queens, Princes and Princesses, to the number of 24, as his worthy God-son and Disciple Sir *Theodore de Vaux* has assur'd me. Tho he was one of the learned'st men of his Age, especially as to the Practical part of Physic, and the choice of Specific remedies, yet he published nothing, that I know of during his life: But his foremention'd Godson Sir *Theodore de Vaux* has enrich'd the World with a Collection of his Remedies, under the Title of *Praxeos Mayer-nianæ Syntagma*, printed for *Sam. Smith* 8°. 1690. and he promises a 2^d part, as well as his Physical Counsels, a specimen of which, that has been communicated to the World, has been highly esteem'd by the most famous Physicians of this Time. Something has been printed of this great man, this very year at *Lyons*. 8°, under the Title of *La Pratique de Medecine de Theodore Turquet de Mayerne, Conseiller & premier Medecin du Roy Charles II. & de la Reine d' Angleterre.* I know not whether this Book is a Translation of that Collection that is come out here in Latin. But certainly the *French* Publishers and the Journalists of *Paris* (a) have written upon very bad Memoirs, when they make Sir *Theodore de Mayerne* who died in 1655 before the Restoration, Privy Counsellor, and first Physician to King *Charles II.* and his Queen, and when they affirm him to be born at *Aubonne*, a Lordship with the Title of a Barony belonging to him. Notwithstanding the change of the Times, Mr. *De Mayerne* maintain'd himself in great Reputation and Credit till his Death; left a hundred thousand pound sterling behind him, and two Daughters, who were marry'd in a most Noble Family of the Protestants of *France*, viz. to two Brothers of the House of *La Force*, the Marquess *de Cuignac*, and the Marquess *de Montpouillan*.

All this being considered, I doubt not in the least, but that there were Worms taken out of the Gums, Tongue, and Face of several Persons by this Woman. The only question is how they came, or were generated and bred in those parts. There is nothing easier than to suppose an equivocal Generation; but this does not satisfy an inquisitive mind; besides the oddness of that Hypothesis, contrary to the notion we have of dull and unactive matter, and the admirable composure of the least animals, in which Microscopes discover to us all the parts necessary to life, as perfect as in Horses and Elephants. This, Sir, I need not prove to you, nor to the most
part

part of those who read my Memoirs in this learned Age. Only I shall observe. 1. That we know not any exterior agent, destitute of understanding, nor even any finite Intelligence, that can order the parts of such matter, as is not prepared to produce animals, in that disposition which is necessary to create life and a kind of spontaneous motion. 2. That Nature, or that constant order instituted by God for the propagation of living Creatures, never mistakes so far as to produce a species for another. 3. That all the Art of Men could never procure the Propagation of a new sort of animals; for those who are produced by the copulation of Males and Females of different kinds, as are *Mules* and *Fumarres*, do never breed, God having taken care lest men should mimick the Works of his Creation. 4. That a vast number of little Insects, and Reptils are insensible to the Eyes, and much more the Eggs whence they are produced. 5. That a great number of others generate and breed in such places where we cannot come at 'em. 6. That all the Animals with which we are thoroughly acquainted, come from an Egg, and are produc'd by Parents.

If it be therefore an act of Prudence necessarily requisite in the Inquiry after Truth, to judge of things unknown to us by incontestable Axioms, rather than by the drift of our prejudices; 'tis plain that there is no equivocal Generation, since nothing can perswade us of it, besides the ignorance we are in of the manner in which some Animals are generated. On the contrary, there are matters of fact and metaphysical principles, as evident as any mathematical demonstration, that assure us that all Plants come out of Seeds, and all Animals are produced by Parents, and that the most wise and perfect Being never changes the ordinary ways of his Providence, except it be for a miraculous occasion, as the confirmation of saving truth, the deliverance of the just, and the punishment of the wicked, &c. Now 'tis clear that Equivocal Generation, if such a thing was, would be a miracle, because contrary to the known and common Laws of Nature: And therefore the abettors of this way of production ought to prove, that such frequent miracles are necessary in the order of Providence; otherwise all the instances they bring forth of the sudden and wonderful formation of Animals signify no more, than that we know not how it happens.

However we are not so quite destitute of solutions as our Adversaries imagin. For as to the Worms above mentioned, I say they were Eggs of Flies, which these Insects had lain in some tender place of the Lips or Face of those Persons, or which being mix'd with the meat, remained intricate amongst their Gums, or in some

some hollowneſs of their Tongue, and there bred as they uſe to do in the dead bodies of Animals.

The room I have left does not allow me to enlarge upon this Subject; and therefore I ſhall only add an inſtance to confirm my conjecture. A *Dutch* Woman had her Leg ſwollen and glandulous about a ſpan from the Knee; the Surgeon, who had her in cure, to know the cauſe of her diſeaſe, took of this glandulous body to the bigneſs of a nail, waſhed it with Brandy, cut it, and perceived therein a great many little Worms; whereupon having conſulted *Mr. Leeuwenhoeck*, he answered they were come from the Eggs, a Fly had lain in the mortified part: which conjecture of his he proved in the following manner.

He put theſe Worms in a Box, with a piece of raw Beef, that was ſoon conſumed by them as well as the glandulous body, wherein they were born. He fed them three ſeveral times, and five days after, viz. July 31, 1687, he found his Box empty, but having look'd carefully over all the Room, he recovered ſome of theſe Worms that would eat no more, and were already grown to the length of ones Nail. He put them upon a paper covered with a large glaſs, and the following day in the morning, he obſerved one of theſe Worms ſhortned in length, but encreaſed a third part in bulk, ſo that it had ſomething of the ſhape of a Tun. On the Evening, he perceived four others in the ſame poſture, that from white began to grow red. *Auguſt 11* the Cods of theſe Worms were all black; he open'd one of them, whence he took out a perfect Fly, that was yet wet and motionleſs. He obſerved that beſides the Cod, this Inſect was wrapt up in a very thin Membrane. He opened this untimely Fly, and found a great quantity of Eggs in its body.

Auguſt 15, all the Flies incloſed in the Glaſs were hatched, and at the ſame time he perceived other Flies againſt the Glaſs Windows of his Chamber, that he ſuppoſed to have come from thoſe Worms, that he had not retrieved. On the 28 he opened three of thoſe Flies, whence he got oblong Eggs, 25 times bigger than thoſe he had taken out of the untimely Fly. In feeding theſe Inſects, the moſt part died, or fled away; ſo that *September 7*, he had but two left, that were probably Male and Female, for they laid 145 eggs. Some of which he cauſed to be hatched, in leſs than 24 hours, by carrying them in his Pocket, ſhut up in a Box.

It's obſervable that Nature's wiſe Author has given ſuch a propenſion to thoſe Creatures, that cannot bring up their progeny, as that they lay their Eggs in proper places to breed them. Thus Flies moſt commonly lay theirs in dead bodies, puſtules, ulcers, or wounds,

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wounds, because in those tender parts their Eggs may sit easily, and find warmth, humidity and food.

Perhaps you will say, that it's not likely a man should swallow as many Eggs of Flies or other Insects, as there are oft found Worms in his Body. To this I answer, that tho there be no Worms generated, where no Eggs of Insects ever were, and tho all Insects come out of Worms, and perhaps Fowls and other Animals too; yet it follows not, that all Worms should become Insects: For, want of air, room and other conveniencies may hinder the transformation, and cause them to persist and breed in the state of Worms. But I am forc'd to defer the explication and confirmation of these conjectures till another time, and so to break off, after having begg'd the continuance of your Friendship, and assured you of the real esteem I shall ever have for your parts and merit.

July, 29.

F I N I S.

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ERRATA in June.

Page 184 line 27 for *perused* read *used*. p. 191 l. 39. for *broad* r. *broad*.

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Those that will do the favor to the Author of these *Memoirs*, to write or send any Papers to him, are desired to direct 'em to his Lodgings, At *Mr. Fage's*, a *Turner*, in *Play-house Yard*, near the *Thistle and Crown*, in *Blackfriars*.

F I N I S.